

## CLAIMS

1. A method of selecting and sorting data packets made available  
5 to a grid (1, 2), by at least one packet data transmission network (3, 4)  
employing a packet format able to comply with three levels of protocols:
  - a first level protocol (5) corresponding to a network  
transmission physical layer (3, 4), governing the general format  
of a packet and imposing the presence in a packet, on the one  
10 hand, of a so-called first level useful-data field (5a) and, on the  
other hand, of so-called first level service information fields  
(5b), including one (52) so-called physical layer destination  
address, assigned to a first destination address and another  
(53) assigned to a second level protocol identifier,
  - 15 - a second level protocol (6) governing the format of the first  
level useful-data field (5a) and able to impose a partition of the  
first level useful-data field (5a) into a so-called second level  
useful-data field (6a) and into the so-called second level  
service information fields (5b), of which one (65), so-called  
20 second level destination address is assigned to a second  
destination address, and including one other (62) assigned to a  
third level protocol identifier, and
  - a possible third level protocol (7) governing the format of the  
second level useful-data field (6a) and able to impose a  
25 partition of the second level useful-data field (6a) into a so-  
called third level useful-data field (7a) and into so-called third  
level service data fields (7b),
said method being characterized in that it consists in:
  - constructing a directory of so-called lower level addresses  
30 mustering, in the form of a list of elements (8), the various  
values taken by the addressing information appearing in the  
service information fields (5b, 6b) of the protocols of the first  
two levels when they relate to the installation,
  - constructing a directory of so-called higher level addresses  
35 mustering, in the form of a list of elements (9), the various  
values taken by the addressing information appearing in the

- service information fields (7b) of the protocols of levels higher than the second level when they relate to the installation,
- establishing, for each element (8) of the list of the directory of lower level addresses a compatibility link with one or more elements (9) of the list of the directory of higher level addresses, this compatibility link signaling the possibility, in respect of two linked elements (8, 9), of simultaneously being in the service information fields (5b, 6b, 7b) of one and the same packet,
  - establishing for each element (9) of the list of the directory of higher level addresses, an assignment link (93) to at least one reception port (24, 30, 32, 33, 34) of the installation (1, 2), and for each packet made available to the installation (1, 2) by the data transmission networks (3, 4):
    - reading the addressing information contained in the service information fields (5b, 6b) of the protocols of the first and second levels,
    - searching for a match (23, 25) between the addressing information read from the service information fields (5b, 6b) of the protocols of the first and second levels and an element (8) of the list of the directory of lower level addresses,
- in the absence of any matching element,
- rejecting the packet,
- in the presence of a matching element,
- taking into consideration the compatibility link of the first matching element (8) so as to select from the list of elements (9) the higher levels addressing directory, the compatible elements,
  - reading the addressing information contained in the service information fields (7b) of the protocols of levels higher than the second,

when addressing information containing the service information fields of the protocols of levels higher than the second are present,

- searching for a match (28) between this information and one of the compatible elements (9) of the list of the directory of higher level addresses,

in the absence of matching elements,

- 5       - rejecting the packet,

in the presence of a matching element,

- selecting the packet made available,
- taking into consideration the assignment link (93) of the matching element,
- 10       - addressing the useful data of the packet to the reception ports (24, 30, 32, 33 or 34) of the installation that are designated by the assignment link (93), and
- creating, if it does not already exist, an allocated message descriptor establishing a relation between the reception ports
- 15       (29, 31) designated by the assignment link (93), the compatibility link and the value of a possible second level service information field assigned to a message fragment identification so as to make it possible to reconcile later, the incoming fragments not possessing any destination address
- 20       information in the service information fields of the protocols of levels higher than the second,

when addressing information contained in the service information fields of the protocols of levels higher than the second are not

25       present,

- searching through the open allocated message descriptors for a match at the level of the compatibility link and of the value of a possible second level service information field assigned to a message fragment identification,

- 30       in the absence of matching elements,

- rejecting the packet,

in the presence of a matching element,

- selecting the packet made available,
- taking into consideration the assignment link of the matching
- 35       element,

- addressing the useful data of the packet to the reception ports of the installation that are designated by the assignment link, and
- searching through the service information fields of the second level of the packet for an end of message information item making it possible to terminate the allocated message descriptor considered.

2. The method as claimed in claim 1, characterized in that the searches for a match are made within the lists of the elements (8, 9) of the directories of lower level and of higher level addresses by following a dichotomy procedure in previously ordered lists.

3. The method as claimed in claim 1, characterized in that the elements (8) of the directory of lower level addresses are stored in a first table, their addresses (MAC/IP N°) within this first table identifying the compatibility links associated with them.

4. The method as claimed in claim 1, characterized in that the elements (9) of the directory of higher level addresses are stored within a second table, each of them being associated, within this second table with a compatibility link (90) and with an assignment link (93).

5. The method as claimed in claim 1, applied within the framework of Ethernet networks with packets respecting a first level protocol of MAC type and a second level protocol of IP type, characterized in that each element (8) of the directory of lower level addresses holds at least one particular value (80) of the MAC destination address field and one particular value (81) of the IP destination address field.

6. The method as claimed in claim 1, applied within the framework of Ethernet networks with packets respecting a first level protocol of MAC type imposing, among the service fields of a packet, a field (53) identifying the protocol respected by the packets at the second level and a second level protocol of IP type, characterized in that each element (8) of the directory of

lower level addresses holds at least one particular value (80) of the MAC destination address field, one particular value (81) of the IP destination address field and a flag (82) for invalidating the particular value (81) of the IP destination address field in case of non-recognition of an IP type second level  
5 protocol.

7. The method as claimed in claim 1, applied within the framework of a duplicate network consisting of two independent Ethernet networks (3, 4) each having access to the installation (1, 2), each of the two Ethernet  
10 networks having packets respecting a first level protocol of MAC type and a second level protocol of IP type, and within the framework of installations (1, 2) is able to identify the network or networks (3, 4) of origin of a packet, characterized in that each element (8) of the directory of lower level addresses holds at least one particular value (80) of the MAC destination  
15 address field, one particular value (81) of the IP destination address field, an identifier (85) of the network or networks of origin of the packet compatible with these particular values (80, 81) of MAC and IP destination address field, and a validation flag (86) for the identifier (86) of the network or networks of origin of the packet.

20

8. The method as claimed in claim 1, applied within the framework of Ethernet networks with packets respecting a first level protocol of MAC type imposing, among the service fields of a packet, a field (53) identifying the protocols respected by the packets at the second level, a second level  
25 protocol of IP type and a third level protocol belonging to a group of protocols containing the UDP and TCP protocols, characterized in that each element (9) of the directory of higher levels holds at least one particular value (91) of destination port UDP/TCP address field and a double flag (92) for validating the particular value (91) of destination port UDP/TCP address field identifying  
30 at the same time a third level protocol compatible with said particular value (91) of destination port UDP/TCP address field.

9. The method as claimed in claim 1, applied within the framework of a duplicate network consisting of two independent Ethernet networks (3, 4)  
35 each having access to the installation (1, 2), each of the two Ethernet

- networks (3, 4) having packets respecting a first level protocol of MAC type, a second level protocol of IP type and a third level protocol belonging to a group of protocols containing the UDP and TCP protocols, and within the framework of installations (1, 2) able to identify the network or networks of
- 5 origin of the packet, characterized in that each element (9) of the directory of higher levels holds at least one particular value (91) of destination port UDP/TCP address field, a double flag (92) for validating the particular value (91) of destination port UDP/TCP address field identifying at the same time a
- 10 third level protocol compatible with said particular value (91) of destination port UDP/TCP address field, an identifier (96) of the network or networks of origin of the packets that are compatible with this particular value (91) of destination port UDP/TCP address field, and a validation flag (97) for the identifier (96) of the network or networks of origin of the packet.